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ABSTRACT

An overwhelming deterrent to the use of film in the classroom has been the inaccessibility of the films and the complicated projectors required to show them. Eight-millimeter film has the potential to lower the cost of films, making them more accessible, and to make showing them vastly simpler. This paper traces the development of 8mm film use in education, noting the various factors which have militated against the full use of the format's possibilities in education. The author describes the state of 8mm educational film and projector as it stands today and points out the potential for local production of films. He predicts a gradual trend to the use of 8mm format in education and to the development of increasingly simple means of projection. (JY)

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8:24 FILM IN EDUCATION
STATUS AND PROSPECTS--1968

Louis Forsdale*

What is so special about 8mm film--in contrast with 16mm or 35mm or 70mm--that this particular gauge should be singled out for consideration? The special import of "8" in education is that it can help make motion pictures vastly more accessible to teachers and students than they are today.

No case need be made here concerning the value of film in education. The problem is that this value is largely potential, so infrequently and so unwisely have films generally been used. An overwhelming deterrent to the use of motion pictures--effectively or not--is their inaccessibility. Our 16mm prints are expensive and therefore are housed in central libraries, to be distributed to teachers who requisition them, generally well in advance. This is an annoying and time consuming process, and it puts off most teachers at the outset. But even the teacher who persists and orders a film is confronted with a second problem: when it arrives it must be shown on a clumsy projector which is difficult to locate, move, set up, and operate. Most teachers prefer to live without these irritants.

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As compared with the book--the best medium to use as a standard in this respect--film is quite inaccessible to the teacher, and if it is inaccessible to the teacher, most educators would never think of asking a student to go to the library and study a motion picture on his own.

The difficulties of using film in education can be alleviated through the use of 8mm systems. Reduced costs of 8mm prints and projectors could enable us to establish film libraries in many individual schools, perhaps some day in individual laboratories and classrooms. And even today some 8mm projectors can be used by five-year-olds (or by "unmechanical" adults) after a minute of instruction, literally.

The biggest dream about 8 in education, then, is that this miniature gauge of film will help bring motion pictures geographically closed to the user, and at the same time make the showing of films vastly simpler. One of these goals is keyed to economics; the other is tied to engineering. Both favor 8mm; both work against 16mm, the film gauge which dominates education today. John Flory, an early advocate of the use of 8mm film in school, church and industry, once called 8 "the paperback of films." Flory's analogy is a good one, although it may be conservative. Considering the current inaccessibility of motion pictures in education, 16mm films might better be likened to manuscripts, chained to monestary reading tables, in which case 8 might be the book liberated and made ubiquitous by the invention of print with moveable type.

Whichever analogy eventually serves best, 8mm will almost certainly have a considerable impact on the uses of moving images

in education, fundamentally changing our present notions of what kinds of films should be made, how they should be purchased, stored and distributed, and how and by whom they should be used.

Film gauges in and out of education

Some background information will be useful in seeing where we stand now and in making some guesses about what the future might hold. 8mm film and associated camera and projection equipment was introduced by Eastman Kodak in 1932 as a motion picture form for amateurs who wanted to make home movies. It caught on, and 8 has remained overwhelmingly an amateur's gauge since that time. 16mm remains the preeminent gauge for non-theatrical professional purposes; 35mm and 70mm dominate the theatrical field.

A variety of film gauges is needed so that the factors of quality, on the one hand, and economy and ease of use, on the other, can be balanced as need requires. In general, the wider the film, the better the picture on the screen: 70mm is elegant for the wide-screen spectaculars. Also in general, the narrower the film, the easier it is to use in a variety of situations: 8mm suits home, school, and library settings. Obviously a 70mm system is more expensive in every way than an 8mm system.

When the move was made in the mid-1920's away from the clumsy 35mm gauge, and toward 16mm as the school standard, there were cries that the smaller gauge could not possibly provide the image quality which was needed. But advocates of 16mm argued, persuasively, that the advantages of portability, space saving, economy, and ease of operation offset the disadvantages of loss in picture quality. Also,

those who knew photography understood that improvements in emulsions, lenses, cameras, projectors, and screens meant that the 35mm quality of 1925 would be equalled by the 16mm quality of 1935. It was. (All gauges improve constantly, of course, so one never catches another in absolute quality: the improvement is relative to a point in time.)

The move toward miniaturization which was begun with 16mm film forty years ago continues today with 8mm. Once regarded as adequate only for amateur use, 8 is now considered by photographic engineers to be good enough today for many professional non-theatrical uses. This is particularly true of Super 8, the new form of 8mm which has a 50 per cent larger picture area than regular 8.

Although the Japanese have used 8 mm film in education for many years, American educational interest in this gauge probably can best be dated from 1960-1961, when two 8mm sound projectors were marketed, one by the Fairchild Camera and Instrument Corporation, the other by the Eastman Kodak Company. Both projectors used standard reel-to-reel threading schemes. Although both were designed primarily for amateurs, they caused a small flurry of interest in education, stimulating, among other things, the convening of a major three-day conference at Teachers College, Columbia University ("8mm Sound Film and Education"), attended by some 150 persons from education, educational film houses, church, government, and the photographic industries. Interest in 8 in education has continued steadily upward since that date, although not only because of the conference, of course.

The cartridge-8 projectors

The first gut level excitement about 8 in education came when The Technicolor Corporation introduced a small, inexpensive 8mm cartridge-loading projector. It was unique in the history of the motion picture. An inexpensive plastic cartridge holding up to four minutes of silent film could be plugged into a projector by anybody, including a five-year-old child. And the projector sold for less than $100. (This cartridge-loading capability is a peculiar technical advantage which 8mm has over wider film gauges. Educators have long complained about the difficulty of using projectors, and have advocated some kind of cartridge-loading system as the solution, but technical difficulties associated with 16mm film have stood in the way of achieving the goal. Because 8mm has one-quarter the mass of 16mm [it is half as wide and half as long], and because it moves within a cartridge at half the linear speed of 16mm, it presents fewer weight and friction problems than does 16, and it can therefore be loaded into inexpensive passiv. cartridges--casettes which merely contain the film but which are not encumbered by expensive gear arrangements to help drive the film forward. The active [motor driven] cartridges which are needed for 16mm film are quite expensive. Indeed, in the two prototypes 16mm cartridge-loading projectors which I have seen, the empty cartridges cost on the order of $25.00 apiece, a good deal more than the film which they were designed to contain! The cause of accessible film is hardly promoted by doubling or tripling costs!)

The Technicolor silent cartridge-loading projector noted above was instantly attractive to educators who saw it. There was, however,

no backlog of films to use with it, primarily because the projector had been designed and first marketed for amateurs. (The decision to limit the cartridge to a four-minute capacity, for example, was made because 8mm home movie cameras generally accommodate four minutes of film in each load.) But the amateur market which was first envisioned for the projector did not materialize, and the Technicolor people turned their attention to the fields of education, training, and sales. Gradually the established educational film houses (and some new ones) began to develop cartridge loop films for the projector, and today the available world-wide total of such films (generally called "single concept films") must number on the order of 7000 titles. The fact that these loops are silent makes traffic across language boundaries possible.

In 1962 the first cartridge-8 sound projector was marketed, by the Fairchild Camera and Instrument Corporation. In contrast with the four-minute cartridge of the Technicolor silent machine, the Fairchild sound projector could accommodate up to twenty-two minutes of film in its plastic cartridges. This rear-screen projector (having the appearance of a television receiver) was designed for use by one person or a handful of people, viewing the small image in a lighted room. Like the Technicolor silent projector, the Fairchild sound machine also lacked a library of films ready for use. Subsequently similar rear-screen cartridge-8 sound projectors were marketed by other companies. Recently the Technicolor Corporation has marketed a sound projector which produces a larger image on a wall screen in a darkened room.

The slow growth of 8mm film in education

Both the silent and the sound cartridge-8 projectors have found their way only slowly into education; 8mm projectors of the traditional threading variety have had almost no impact. The cartridge machines have been used to a much greater extent in business and industry, for sales and training purposes. Among early (and continuing) industrial users of cartridge-8 have been various pharmaceutical houses, automobile and other heavy equipment manufacturers and certain retail chains which conduct continuing employee training programs. It is not surprising that business and industry should turn more quickly to an attractive new communication device. They have greater fiscal mobility than most schools have. Further, to pinpoint a special advantage, many industrial and business firms are quite prepared to make films which are specifically designed for cartridge projectors and to make sufficient copies for widespread use in their sales and training programs. They are therefore generally not disturbed by lack of existing libraries of films for the machines.

General inertia has impeded the growth of 8mm film in American education, of course. A more specific problem is that 8mm is not a new medium; it is, rather a variation of the established medium of film. From the perspective of an experienced 16mm film maker or film user, 8 can seem terribly tangential: it may be a nice adjunct, but isn't it, after all, at least a little amateurish, rather cute, somewhat gimmicky? 8 always stands in the shadow of its older and bigger brother, 16.

Nor is this true only in the schools. The new "learning

industries" have been publicized for half a dozen years now, and, in their planning with respect to educational technology, all of these still emerging enterprises have investigated 8, among other media. Still, their plans for the future, with respect to 8, seem to be unduly cautious. Indeed, the lack of research and development activity (which might lead to greater daring) in educational film houses and in most of publishing is astonishing to behold!). To be sure, the educational photographic market is still an economic peanut compared with the amateur market, and until dollars flow massively in education prudence will doubtless caution against vigorous advocacy of 8mm systems, especially where that advocacy might raise questions about the future role of 16mm prints and equipment.

The sound track and format debates

Two specific engineering/economic problems have plagued everybody in or around the 8mm field for the past several years, and have therefore slowed the acceptance of 8. One of the problems is still unresolved; the other is largely solved now.

The first problem (and the one which is unresolved) is the question of what kind of sound track, technically speaking, should be used on 8mm prints. Two types of sound tracks are used in motion pictures. Most 16mm and 35mm films have optical tracks, in which the sound is recorded as part of the photographic emulsion, appearing as a strip of varying shades of gray along the edge of the film. The second sound track is magnetic, in which the sound is "stored" on a stripe of iron oxide along the edge of the film. Magnetic tracks are used on 70mm theatrical films, on a very few 35mm and 16mm prints,

and on a considerable number of 8mm prints. If all motion picture prints were lumped together, optical tracks would be found on the overwhelming majority of them; optical tracks are cheaper than magnetic tracks to reproduce. Magnetic tracks are inherently superior to optical tracks in quality of sound produced, however, and they have some advantage in prolonging print life, particularly when a print is subject to heavy use. The magnetic track also presents the amateur (and other local producer who has limited resources) with the opportunity of adding a modest sound track to a homemade film with a minimum amount of difficulty. The principal disadvantage of the magnetic track is that it is somewhat more expensive to use in the print-making process than is the optical track, at least when present printing equipment is employed. Advocates of the magnetic track argue, however, that added print life which results from this process more than offsets the added initial cost.

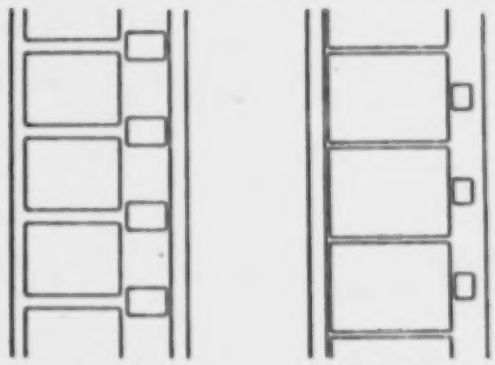
In the early and mid-1960's, when serious talk about professional uses of 8mm film started, engineers, controllers and salesmen started a still-continuing debate about which of the sound tracks should be used in making 8mm prints. The magnetic track gained the ascendancy at the outset, and there are probably more 8mm sound prints in use today with magnetic tracks that with optical tracks. Three cartridge-8 projectors use magnetic tracks; one uses the optical tract. Standard reel-to-reel 8mm projectors use both tracks although the magnetic track dominates. Major commitments have been made by photographic laboratories--and labs are a most critical element in the total scheme--for both magnetic and optical printing and

processing facilities. In short, the issue is by no means settled. Nor can one necessarily anticipate either a quick or an easy resolution of the problem. While one system may eventually gain commercial superiority over the other, it appears to me that both tracks will exist side by side for some time as we engage in a pragmatic test of the quality and cost questions.

Meanwhile--returning to the reason for talking about sound tracks--financial commitment to 8mm has been slowed by the presence of two tracks and by lack of clear-cut industry support for one over the other. A rather dramatic example of reluctance to invest in 8 because of the unrest over sound tracks involves the Methodist Church of the United States. The Methodists have a centralized purchasing power backed by some 30,000 local churches, and for years their leaders have been interested in using 8mm film for Sunday school and other church work. In the mid-1960's they had in fact nearly committed the church to an experimental program of distributing 8mm prints in a Film-of-the-Month plan, using magnetic sound, and many observers were eagerly awaiting the adventuresome scheme. Then the sound track debate opened. They pulled back, aborting in the early stages of this promising new venture in accessible film. Other groups have doubtless been cowed at the very outset by the ambiguities of the sound track issue.

The second technical problem, now largely resolved, relates to what format should be used on 8mm film. Format means the size and arrangement of the sprocket holes, the picture, and the sound track on the ribbon of film. With the serious attention to 8mm film as a professional gauge came a re-evaluation of the capabilities of the regular

8mm format which had been used since 1932. Engineers reasoned that improvements could be made in the quality of the projected picture if the area given over to the picture in the film could be enlarged. As the illustration below shows, the key to making the picture area greater was reducing the size of the sprocket holes.



Many format proposals were aired and argued in engineering circles, but it soon became clear that Super 8 (see illustration above), the new format which Kodak had designed, would eventually win the day. As a result, traffic in 8 slowed (or failed ro rise) while everyone waited to see what impact Super 8 would have. The impact became obvious more quickly than most observers suspected it would. Within a few months after its marketing, it was clear that Super 8 film would in time innundate regular 8 as clearly as LP records had submerged 78 rpm's many years before. The immediate future of 8 lies with Super 8.

There is no doubt that Super 8 is technically superior to

regular 8. Its picture is sharper and brighter; its sound is better. It is also doubtless true that the overall economic position of 8mm film has been enhanced by the introduction of Super 8. Amateurs have eagerly accepted the dozens of new, often highly sophisticated Super 8 cameras and projectors. In the professional marketplace (schools, colleges, etc.) many dealers are providing trade-in arrangements for owners of regular 8 films and projectors who now want to switch to Super 8. Almost all new projector designs are for Super 8 films.

While two sound tracks and two formats make for more confusion in the marketplace than anyone likes, if the market for 8mm prints becomes big enough this multiplicity of choices will be possible to live with, as has been the case with phonograph records. In the phonograph recording field, there are two dominant speeds (45 rpm and 33-1/3 rpm), and, for 33-1/3 records, both monaural and stereo versions are often available, although stereo records are gradually taking over completely. For a long time now most record playing machines have been capable of playing both of these speeds, as well as the older 78 rpm speed. The analogy between phonograph records and 8mm films cannot be carried too far, however, partly because multi-speed, two-sound-track, two-format 8mm movie projectors are a good deal more expensive than are multi-speed, two-needle record players. A bigger drawback in the analogy is that the recording industry rests upon a very large, very solid, home market; educational purchases neither make nor break it. The sale of educational films, however, is restricted to a comparatively small institutional market. A big market permits stocking large inventories, which, in turn, permits

diversity within the inventory.

Cartridge incompatibility

The problem of cartridge incompatibility from projector to projector also discourages potential users of 8mm film today. There is only one manufacturer of silent cartridge-8 projectors--The Technicolor Corporation. Still, Technicolor makes Super-8 and regular 8-silent projectors and the cartridges are not interchangeable between machines. Although interpretations of the world "major" vary, there are at least three major sound cartridge-8 projector manufacturers. (Fairchild, Technicolor and MPO). No cartridge from any of these projectors fits any other projector. If markets were large enough, as noted earlier, the distributor of films could simply stock titles in the various cartridges or load them in designated cartridges on demand, but the market is too small to be fragmented and remain solvent.

Why, then, don't projector manufacturers agree upon a particular cartridge and resolve the indecision? A first answer is that in this country manufacturers are prevented by law from entering into agreements with each other about the characteristics of a product in advance of the production of that product. Such agreements are regarded as collusion in restraint of trade. Standardization and compatibility are achieved when a manufacturer markets a product which is worthy of emulation. If others want to manufacture it they are either licensed (generally at a cost) to do so, or are simply given the necessary plans. What has occurred in the cartridge-8 field, to simplify, is that none of the manufacturers to date has marketed a product which in its design is thought to be so superior that other manufacturers

have sought it out. Also, many manufacturers have felt that cartridge compatibility really isn't yet a major issue. This last statement may seem nonsensical unless one recalls that most of the cartridge-8 projectors are used in business and industry, where a company makes its own sales and training films for the projector model which it has purchased.

Some stability is likely to come to the cartridge scene in the Fall of 1969 when Eastman Kodak markets the first of a new series of cartridge-8 projectors. Their system will be quite different from existing cartridge projectors. The endless loop cartridge will be sacrificed in favor of an extremely fast rewind. Because the designs of the Eastman cartridge and projector are unique, they are not likely to be regarded as merely other sheep in the pack. The cost of the Kodak cartridge will be markedly lower than that of other cartridges, and Eastman hopes that it will therefore appeal to both amateur and professional markets, as no existing cartridge does, thus providing that broad base of economic support which is so necessary for lowering the cost of projectors, and, eventually, of prints. As compared with other manufacturers now active in the cartridge-8 field, Eastman is a massive force--in terms of engineering talent as well as manufacturing and marketing ability--and their force has not yet been felt in a major way in the professional 8mm projector field. Further--and this is a point of pivotal importance--Kodak has systematically informed the photographic manufacturers of the world of its cartridge projector plans, and has equipped them with exact plans of key parts of the system (the cartridge, for example) and invited them to design projectors

to fit the scheme. As a result of this strategy, projectors designed by several manufacturers should be marketed at the same time--in late 1969, all based on the Kodak cartridge system.

This approach is similar to the demonstrably successful technique which Eastman used in launching Super 8. Kodak began about two years in advance of the date on which they planned to introduce Super 8 to inform the photographic world of their plans, saying in effect, "Here is what we are going to do, charted to the last millimeter; make equipment of your own to fit into this system if you wish." The photographic industry liked the look of the new format, with the result that scores of Super 8 cameras and projectors from the United States, Europe and Japan were introduced to the public in a united front. The photographic manufacturers of the world had volunteered to follow the persuasive lead of the giant of the industry and Kodak gained from its design "give away" plan. With nearly every camera and projector manufacturer in the world turning out Super 8 equipment, Kodak concentrated on its two specialties: producing raw film stock and making new equipment for the low cost mass amateur market.

Many observers feel that Kodak may be able to "pull a Super 8" with their new cartridge-loading projectors. If they can (and I side with those who feel that they can), that fact would be the biggest event in the history of professional 8. It would probably break all kinds of log jams.

An apology for the technical talk

What has gone before in this paper is heavily colored by technological considerations. This is not because human factors are

irrelevant, but rather because the motion picture, like still photography or television, exists in and because of technical devices. Erwin Panofsky observed once that the rise of film art " . . . took place under conditions contrary to precedent. It was not an artistic urge that gave rise to the discovery and gradual perfection of a new technique; it was the technical invention that gave rise to the discovery and gradual perfection of a new art."[2]

Technical advances affect film and its uses vitally. The maturation of 8mm film in education has been rooted in technical advances: better cameras, better films, new projectors. A cartridge projector, for example, was made and we then set about finding its uses. (Magnetic tape recorders in an earlier day were marketed and then educators found dozens of uses for them.) This technology-first, use-second pattern is not unique with communication technology, of course, nor do I think it is particularly unfortunate. Educational inventiveness can proceed quite usefully from the stimulation of seeing a gadget and then wondering how the gadget (and modifications of it) can be used. And--though it may be heresy--I am not at all sure that this device-oriented approach is less productive in the long run than the more academically pure need-based approach may be. But, be that as it may, the ups and downs of 8 in education simply cannot be understood without an elementary knowledge of such technical facts as have been presented here.

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2. Erwin Panofsky, "Style and Medium in the Motion pictures." in Daniel Talbot (ed.) Film: an Anthology, New York: Simon and Schuster, 1959, p. 15.

Where does 8 stand today?

Where, then, do we stand today with respect to the use of 8mm films in American education? (The problems of 8 abroad are somewhat different and are not treated here except by implication.)

First, to touch upon something which has not been alluded to yet, the local production of motion pictures by students and teachers has been stimulated by the growth of 8. More films, both dramatic and didactic in nature, are being produced in schools today than were a decade ago. This is a highly visible development, even though the numbers of participants are small; it is exciting to see films produced by children and teachers. The educational possibilities of locally produced "grass root" films are many and may be likened to the preparation of local "printed" material via mimeograph, xerox, ditto, or similar means. The day may well come when George Eastman's ubiquitous box will insinuate its way into education as profoundly as it has permeated its way into American family life.

A second observation about the state of 8 today--and a more important one--is that commercially produced 8mm films already firmly occupy a small corner of the educational film world. It is a new corner, furthermore, and thus represents expansion of educational film use, not a significant displacement of traditional uses of 16mm film. The new corner which is occupied by 8 is the rather specialized one of individual or small group use of motion pictures. It is dominated by cartridged films, most particularly by the so-called "single concept" films. "Single concept" films are the short (four minute or under) silent loop films which are used with the Technicolor "Instant Movie

Projector," the largest selling 8mm cartridge projector. These films are most frequently sold in packages of, say, four or six or twelve cartridges which treat subjects ranging from fluid mechanics to silk screen processes to life in Afghanistan. Some of these loops have been cannibalized from longer films, but most are now developed from scratch to capitalize specifically on the formal qualities of loops.

I feel that the term "single concept" is somewhat misleading. No film can present only a single concept. A far better descriptive phrase for films of this style would be "short, silent loops," for it is the shortness, the silence, and the "loopiness" which are the important formal characteristics. Still, by whatever name, these mini-films are so dramatically different from past film forms that they have invited the extravagant but inaccurate conclusion that the whole future of 8 points in their direction.

No doubt short loop films, silent and sound, will continue to be designed and marketed in 8, but educational planners would be foolish to limit their thinking about 8 to a single film style or genre, including the currently popular "single concept" one. It is more productive to think of 8 as a flexible, inexpensive and highly accessible means of packaging the whole range of moving visual images. (The awkward phrase "moving visual image" is used as a generic term to describe what is packaged by film or video tape, or, for that matter, the new video disc.) 8 can be used today with groups of 25 to 35 with existing inexpensive projectors, and tomorrow 8 can undoubtedly be used with groups up to 500 in size with projectors which can be made if we want them. That is, 8 is actually potentially capable of handling

95 per cent of the needs of film in education; it is, therefore, frontally competitive with 16mm, at least theoretically.

To return to a theme stated early in this paper, the biggest gain which is possible with 8 in education is making film, in all of its forms, readily and randomly accessible to the teacher and student, when it is needed, where it is needed and as frequently as it is needed. We have lived so long with inaccessible film, however, that it is difficult for most of us to think of the possibility of making a big breakthrough. The most frequently suggested solutions to the problem of inaccessible film--financing exisitng approaches more heavily, improving such administrative procedures as booking and distribution, training more student projectionists, requiring of all teachers-in-training a course in audio-visual education, etc.--are all useful, but not radical in the sense of getting at the root of the problem. The root of the problem is twofold: dependence on centralized film libraries which are geographically removed from points of utilization and dependence on projectors which are difficult to use. Both problems can be attacked significantly by embracing the emerging 8mm technology.

Other approaches to making the moving image accessible must be considered, of course, particularly the electronic alternatives offered by television and video tape. Television transmission is an efficient means of making a particular moving image available to large numbers of people at a precisely given time. TV programs are delivered in accordance with a centrally determined schedule, of course, not on demand of the learner. In short, they are not randomly accessible, either to

groups or to individuals. To stretch the matter, TV is to the moving image what sky writing is to print. Delivery of video tape by mail or local "bicycling" is exactly the process now used with film. Video tape suffers by comparison, however, partly because the tapes are cumbersome, but also because machines are a great deal more expensive and temperamental than motion picture projectors are. Perhaps video discs will mature rapidly as a means of lowering costs, but they will suffer, as do all video systems, from a small image size.

The future?

No one can foresee the future, not even the future of this tiny corner of our lives. But one can guess.

I think that technical facts point overwhelmingly to the possibility that 8mm film will largely replace our 16mm libraries, in time. This is an opinion which is seldom aired, least of all by photographic manufacturers who have the most intimate knowledge of technical advances. While they would welcome the increased sales which would almost inevitably accompany a transition to 8, they hesitate to speak of such matters for fear of creating panic among the holders of 16mm films. And, interestingly enough, many persons in the photographic industry who can see all of the pieces of an accessible 8mm professional film system right before them fail to put those pieces together in their minds. Eyes are more generally on the big action--the massive amateur market.

There is really little reason to panic at the thought of the obsolescence of 16mm film libraries in education. Our investment there is large only if we think of it that way, and, more importantly, it is not a static investment. If our prints and projectors are used they will

wear out, at which time they can be replaced by 8. If they aren't being worn out they aren't being used and we should ask whether that is a good investment. Nor would a gradual transition to 8 be disastrous to educational film houses. All of their master negatives can be printed quite easily on Super 8.

To make a difference in the educational film field, 8 must reach mass production proportions. At the present time successful 16mm school films sell, say, 750-1000 copies--during the lifetime of a title. A few extraordinary titles sell as many as 5000 copies. Given the number of schools which we have, these figures are incredibly small; they really do make 16mm prints seem a bit like medieval manuscripts. We should be thinking of 10,000, 25,000 or 50,000 copies of films, a figure which is perfectly possible to achieve in Super 8 with laboratory printers which now exist. The only thing missing is consumer demand in education.

The educational demand for films turns heavily on projector innovation, as I have repeatedly suggested. While low quality pictures and sound will not be acceptable no matter how stunningly simple the projectors are, low quality is not at all necessary with 8 today. Quality is already quite good and the remaining major technical limitation--inadequate image brightness on a classroom or auditorium screen--is about to be solved in a dramatic way. Within a year after this paper is read, the next generation of 8mm projectors will be ready to market, as will a sensational (I choose the word with utmost care) new screen, which is capable of reflecting at about eight times the brightness of any screen now in widespread use. It is now being

marketed in small typewriter paper size by Kodak, and will shortly be available in a 30" x 40" size which will be suitable for classroom projection. When this screen is used, 8mm films can be shown in an undarkened classroom!

At the very minimum, 8mm has already made its mark on education by expanding our uses of the film medium. At the maximum, it can be the vehicle to place film almost literally at our fingertips--in classrooms, laboratory, library, home, office and factory. If we have the chance deliberately to intervene in ways that will enhance the maturation of 8 in education, there is no doubt that we should grasp those opportunities. There is no development in educational media--in television, programming, print--with greater promise than this one.